

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
6 May 2004 (06.05.2004)

PCT

(10) International Publication Number
WO 2004/038106 A1

(51) International Patent Classification⁷: E02B 17/00,
F16L 1/26, B32B 15/08

(21) International Application Number:
PCT/GB2003/004628

(22) International Filing Date: 28 October 2003 (28.10.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/421,739 28 October 2002 (28.10.2002) US

(71) Applicant (for all designated States except US): INTEL-
LIGENT ENGINEERING (BAHAMAS) LIMITED
[BS/BS]; Bahamas International Trust Building, Bank
Lane, PO Box N. 8188, Nassau (BS).

(71) Applicant (for MW only): LEEMING, John, Gerard
[GB/GB]; 14 South Square, Gray's Inn, London WC1R
5JJ (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): MARSHALL, Pe-
ter, W. [US/US]; 5100 San Felipe, #107E, Houston, TX

77056 (US). KENNEDY, Stephen [CA/CA]; Intelligent
Engineering Canada, 72 Chamberlain Avenue, Ottawa, On-
tario K1S 1V9 (CA).

(74) Agents: LEEMING, John, Gerard et al.; J.A. KEMP
& CO., 14 South Square, Gray's Inn, London WC1R 5JJ
(GB).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE,
GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR,
KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,
MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT,
RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR,
TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

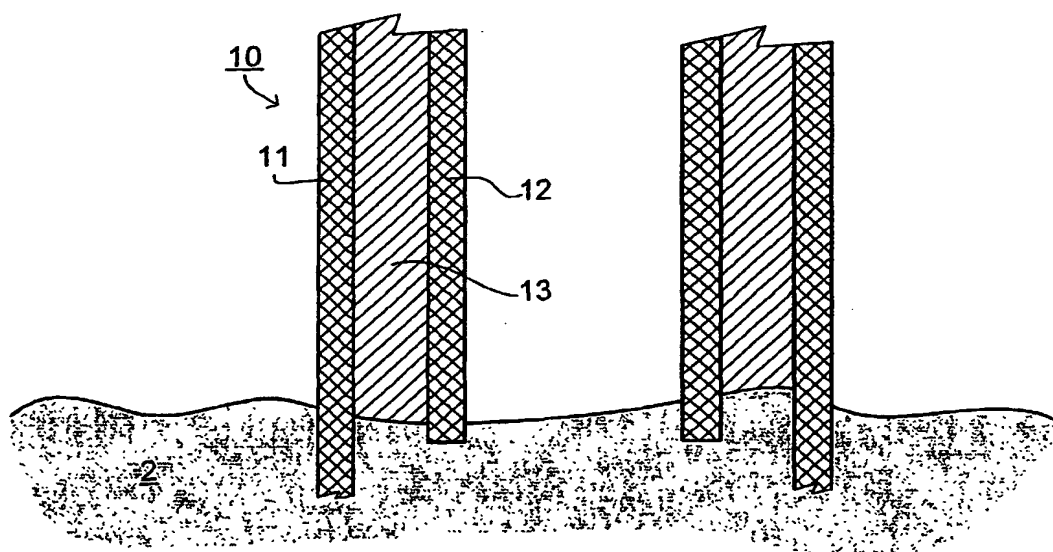
(84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

[Continued on next page]

(54) Title: REINFORCEMENT OF TUBULAR STRUCTURES



(57) Abstract: A tubular structure is reinforced or reinstated by providing a reinforcing layer in its interior in spaced relation to the existing structure so that a cavity is formed. Plastics or polymer material, preferably a compact elastomer, is injected into the cavity and cures to bond the existing structure and reinforcing layer together so that shear forces are transferred and the reinforced structure behaves as a composite body.